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REPUBLIEK VAN SUID AFRIKA

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REPUBLIC OF SOUTH AFRICA

PATENT OFFICE
DEPARTMENT OF TRADE AND INDUSTRY

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The documents attached hereto are true copies of Form P2, P6 and provisional specification and drawings of South African Patent Application No. 2004/0376 in the name of Kotze, Leon; Richter, Alexander Franz

Filed : 19 January 2004

Entitled : Telecommunications System Indicator and Protector

Geteken te **PRETORIA** in die Republiek van Suid-Afrika, hierdie **16 March 2005**
Signed at in the Republic of South Africa, this

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PRIORITY DOCUMENT
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FORM P.2

REPUBLIC OF SOUTH AFRICA	REGISTER OF PATENTS	PATENTS ACT, 1978

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APPLICANTS SUBSTITUTED:	DATE REGISTERED
71	

ASSIGNEE(S)	DATE REGISTERED
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PRIORITY CLAIMED	COUNTRY	NUMBER	DATE
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TITLE OF INVENTION

54 TELECOMMUNICATIONS SYSTEM INDICATOR AND PROTECTOR

ADDRESS OF APPLICANT(S)/PATENTEE(S)

1. 72 WILLOW STREET, KLIPRIVIER, 1871, GAUTENG, SOUTH AFRICA
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ADDRESS FOR SERVICE	S & F REF
74 SPOOR & FISHER, SANDTON	PA136667/P

PATENT OF ADDITION NO.	DATE OF ANY CHANGE
61	
FRESH APPLICATION BASED ON	**DATE OF ANY CHANGE**

376

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REPUBLIC OF SOUTH AFRICA
REVENUE
FORM P.1

REPUBLIC OF SOUTH AFRICA
PATENTS ACT, 1978

APPLICATION FOR A PATENT
AND ACKNOWLEDGEMENT OF RECEIPT
(Section 30 (1) – Regulation 22)

19 JAN 2004
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PRETORIA
REPUBLIEK VAN SUID AFRIKA

The granting of a patent is hereby requested by the undermentioned applicant on the basis of the present application filed in duplicate

OFFICIAL APPLICATION NO.

21	01	• • 2004/0376

S & F REFERENCE: PA136667/P

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TITLE OF INVENTION

54	TELECOMMUNICATIONS SYSTEM INDICATOR AND PROTECTOR

THE APPLICANT CLAIMS PRIORITY AS SET OUT ON THE ACCOMPANYING FORM P.2. THE EARLIEST PRIORITY CLAIM IS:

COUNTRY:	NUMBER:	DATE:
NIL	NIL	NIL

THIS APPLICATION IS FOR A PATENT OF ADDITION TO PATENT APPLICATION NO.

21	01	

THIS APPLICATION IS A FRESH APPLICATION IN TERMS OF SECTION 37 AND IS BASED ON APPLICATION NO.

21	01	

THIS APPLICATION IS ACCOMPANIED BY:

- ☒ 1. A single copy of a provisional specification of 11 pages.
- ☒ 2. Drawings of 4 sheets.
- ☐ 3. Publication particulars and abstract (Form P.8 in duplicate).
- ☐ 4. A copy of Figure of the drawings (if any) for the abstract.
- ☐ 5. Assignment of invention.
- ☐ 6. Certified priority document.
- ☐ 7. Translation of the priority document.
- ☐ 8. Assignment of priority rights.
- ☐ 9. A copy of the Form P.2 and the specification of S.A. Patent Application No .
- ☒ 10. Declaration and power of attorney on Form P.3.
- ☐ 11. Request for ante-dating on Form P.4.
- ☐ 12. Request for classification on Form P.9.
- ☒ 13. Form P.2 in duplicate.
- ☐ 14. Other.

74	ADDRESS FOR SERVICE: SPOOR & FISHER, SANDTON

Dated: 19 January 2004

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PATENT ATTORNEYS FOR THE APPLICANT(S)

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REGISTRAR OF PATENTS

TELECOMMUNICATIONS SYSTEM INDICATOR AND PROTECTOR

BACKGROUND OF THE INVENTION

THIS invention relates to a telecommunications system indicator and protector.

End users of fixed line telecommunications service providers are often confronted with the problem of establishing whether a breakdown in communication is attributable to a problem on the side of the telecommunications service provider or due to faulty equipment of the end user. Invariably an end user will first contact his service provider to request a technician to be sent out to inspect the telecommunications link. In many instances the technician will inform the user that the link is working and that the breakdown in communication is due to faulty equipment. This is an undesirable state of affairs for a number of reasons. These include that time is wasted in waiting for a technician to be sent to attend to a call-out and that unnecessary costs are incurred in order to re-establish communication.

Owners of switchboards have in the past had the problem of identifying whether all their telecommunications lines are in working order. For example, a firm may rent ten telecommunications lines from a fixed line telecommunications service provider, but due to a problem on the side of the service provider, only eight lines are in working order. As it will rarely happen that all eight lines are required simultaneously, the firm will never

become aware of the problem and that it is in effect paying rent for two lines which can not be used.

Lightning is a constant threat to telecommunications equipment and there is a constant demand for equipment which can provide protection against lightning. To date lightning protection systems have made use of earth-based circuitry. In a number of instances such circuitry has proven not to be effective as lightning found alternative routes via the earth connection of the circuitry to the equipment thereby causing severe damage. It is therefore envisaged that a demand may exist under users of fixed line telecommunications services for an apparatus which will enable them to determine the working status of their telecommunications lines and that of their telecommunications equipment while simultaneously providing means for protecting the telecommunications equipment against lighting.

It is an object of the invention to address the above problems.

SUMMARY OF THE INVENTION

According to the present invention there is provided a telecommunications system indicator and protector for indicating the working status of a telecommunications line and of equipment which can be connected to the telecommunications line, the telecommunications system indicator and protector including:

- connecting means whereby the telecommunications system indicator and protector can be connected to the telecommunications line and the equipment respectively;

- a line testing circuit;

- an equipment testing circuit;

- a switch, the switch being movable between a first position wherein the telecommunications line is connected to the line testing circuit and a second position wherein the telecommunications line is connected to the equipment testing circuit; and

- an indicator for indicating whether the telecommunications line is in working order when the switch is located in the first position, and whether the equipment is in working order when the switch is located in the second position.

In a first embodiment of the invention the indicator is provided by a light source which emits light to indicate that the telecommunications line is in working order when the switch is located in the first position and wherein the light source emits light to indicate that the equipment is in working order when the switch is located in the second position.

In the first embodiment of the invention the light source is a light emitting diode.

Preferably the switch is movable to a third position wherein the telecommunications line is disconnected from the equipment.

Advantageously the equipment testing circuit includes a lightning protector for protecting the equipment against lighting.

Typically the equipment is a modem, a telephone , a fax machine or PABX system.

According to a further aspect of the present invention there is provided a telecommunications system indicator and protector comprising:

- connecting means whereby the telecommunications system indicator and protector can be connected to a telecommunications line and to equipment respectively;

- a non-earthed protection circuit;

- a lightning protector; and

- an indicator for indicating whether the lightning protector is in working order.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described in more detail, by way of example only, with reference to the following drawings wherein:

Figure 1 shows a schematic representation of a telecommunications system indicator and protector according to the present invention connected to a telecommunications line at one end and to telecommunications equipment at the other end;

Figure 2 shows a circuit diagram of a first embodiment of the telecommunications system indicator and protector;

Figure 3 shows a circuit diagram of a second embodiment of a telecommunications system indicator and protector according to the invention; and

Figure 4 shows a circuit diagram of a third embodiment of a telecommunications system indicator and protector according to the invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

Figure 1 shows a telecommunications system indicator and protector 10 according to the invention connected at one end thereof to telecommunications equipment, here a modem 12 and a telephone 14, and to a telecommunications connection 16 of a fixed line telecommunications service provider at the other. The telecommunications connection in this description is a telephone line. The telecommunications systems indicator and protector 10 is connected to the telecommunications equipment through connecting means provided by three RJ11 plugs, one of which is shown and indicated with the reference numeral 17.

According to a first embodiment of the invention, shown in Figure 2, the telecommunications system indicator and protector 10 comprises a switch 18 which is movable between different positions thereby to connect the telecommunications connection 16 to different testing circuits, indicated respectively as Block A, Block B and Position C.

With the switch 18 in its first position SW1 the telecommunications connection 16 is connected to a line testing circuit, indicated as Block B, comprising an alternating current (AC) circuit 20 and a direct current (DC) circuit 22. A rectifier 24 is provided for converting alternating current of the AC line testing circuit 20 to a direct current which can flow in the DC line testing circuit 22. The DC line testing circuit 22 comprises a resistor 26, which is used for regulating current therein, and an indicator and protector, in this embodiment a light source in the form of a light emitting diode (LED) 28.

To test whether the telecommunications connection 16 is faulty, a user moves the switch 18 of the telecommunications system indicator and protector 10 to the first position SW1. In the event of the telecommunications connection being in working order, alternating current flows from the telecommunications connection 16 through the switch 18 to the line testing circuit (Block B). In the line testing circuit the alternating

current flows through the rectifier 24, closing the AC line testing circuit 20, thereby allowing the rectifier 24 to convert alternating current from the AC line testing circuit 20 to direct current in the DC line testing circuit 22. This provides current to the LED 28, causing it to emit light. If the telecommunications connection 16 is faulty as a result of a line fault in the telecommunications network, no current flows from the telecommunications connection 16. This causes an open circuit in the AC line testing circuit 22 resulting in no current flow in the DC line testing circuit 24. Ultimately the LED 28 does not emit light thereby indicating to a user that there is a problem on the side of the telecommunications service provider.

Moving the switch 18 to its second position SW2 causes it to connect the telecommunications connection 16 to the equipment testing circuit (Block A). The equipment testing circuit comprises an AC equipment testing circuit 30 and a DC equipment testing circuit 32. The AC equipment testing circuit 30 includes a lighting protector, generally indicated with the reference 34, provided by a resistor 35 which is connected to a capacitor 36. The capacitor 36 is parallel connected to the equipment testing circuit (Block A) allowing it to protect the circuit from over currents in the form of spikes or surges. The AC equipment testing circuit further comprises a rectifier 38 for converting alternating current in the AC equipment testing circuit 30 to direct current in the DC equipment testing circuit 32. The rectifier 38 is further connected to a resistor 40 for regulating current to the LED 28.

To test whether his equipment is faulty a user moves the switch 18 of the telecommunications system indicator and protector 10 to the second position SW2. If the telecommunications connection is in working order, current flows therefrom through the resistor 34 and to the modem 12 and the telephone 14. With the modem 12 and telephone 14 in working order, the rectifier 38 forms part of a closed circuit thereby allowing the rectifier 38 to convert alternating current from the AC equipment testing circuit 30 to direct current in the DC equipment testing circuit 32. With current flowing in the DC equipment testing circuit 32, the LED 28 emits light indicating to the

user that the equipment is in working order. However, should either the modem 12 or telephone 14 be faulty, an open circuit will result in the AC equipment testing circuit 30 preventing any current from flowing in the DC equipment testing circuit 32.

The switch 18 is also movable to an open position (position C), wherein the telecommunications connection 16 is disconnected from the equipment thereby to protect them against, for example, lightning.

A second embodiment of the telecommunications system indicator and protector 42 is provided for accommodating a four-wire telecommunications line, for example a 4-Wire E/M PABX Tieline where typically one pair of lines is used for audio transmission and audio reception, and the other pair is used for signaling. This is shown in Figure 3 where the telecommunications system indicator and protector 42 comprises four wires which form a first telecommunications line pair 44 and a second telecommunications line pair 46, with equipment connected to the telecommunications connection 16, in particular a modem 12 connected to a fax machine 14. According to this embodiment the first line pair 44 and the second line pair 46 can be tested separately, while the equipment connected thereto can also be tested.

The telecommunications system indicator and protector 42 comprises a first switch 48 and a second switch 50; as well as a first LED 52 and a second LED 54. Each switch is movable between different testing circuits in the telecommunications system indicator and protector 42, the different testing circuits being line testing circuits, equipment testing circuits and open positions. Only one equipment testing circuit Block A, line testing circuit Block B and open Position C is shown in Figure 3 but persons skilled in the field of telecommunications will be able to identify the remaining circuits and open positions. Each line testing circuit (Block B) comprises the same components and has the same configuration as the line testing circuit of the first embodiment which has been described in detail above. Similarly the equipment testing circuits (Block A) of this embodiment is the same as that

which is described above except for the fact that that each line pair has its own LED 52 and 54. This configuration enables a user to test whether the first line pair 44 is faulty by locating the first switch 48 to its line testing position. Should the first LED 52 emit light it would indicate that a current is flowing in the first line pair line testing circuit meaning that the first line pair 44 is in a good working order. To test the working of the second line pair 46, the second switch 50 is moved to its line testing position. Should the second LED 54 emit light it would indicate that current is flowing in the second line pair line testing circuit and that the second line pair 46 is in working order.

The status of the equipment is tested by switching the first switch 48, the second switch 50 or both switches to their respective equipment testing circuits (Block A). If it is confirmed that both line pairs are working, both LED's will light up in the event that both equipment are working order. In the event of one line pair being faulty and the equipment being in working order, only the LED of the working line pair will light up.

Figure 4 shows a fourth embodiment of a telecommunications system indicator and protector in accordance with the present invention generally indicated with the reference numeral 100. The telecommunication system indicator and protector 100 comprises a protection circuit which is equivalent to the line testing circuit indicated by the Block A in Figure 2, with the exception that the switch 18 has been removed. Here the protection circuit is indicated with the reference numeral 102.

The telecommunications system indicator and protector 100 is shown to be connected to telecommunications equipment, here a modem and a telephone, at one end and to a telecommunications connection 104 of a fixed line telecommunications service provider at the other. As in the first embodiment of the invention the telecommunications connection is a telephone line and the equipment and telephone line is connected to the telecommunications system indicator and protector 100 with the use of three RJ11 plugs 106.

It is pointed out that the protection circuit 102 is not earthed.

The protection circuit comprises an alternating current (AC) circuit 108 and a direct current (DC) circuit 110. A rectifier 112 is provided between these circuits for converting the alternating current of the AC circuit 108 to a direct current which can flow through the DC circuit 110. The DC circuit 110 comprises a resistor 114 which regulates current flowing therein, and an indicator 116, here in the form of a light emitting diode (LED). The AC circuit 108 comprises a lightning protector 118. In this embodiment the lighting protector 118 is provided by a resistor 120 and a capacitor 122, here a 2kV capacitor.

Under normal working conditions alternating current flows from the telecommunications connection 104 through the AC circuit 108 and through the rectifier 112, closing the AC circuit, thereby allowing the rectifier 112 to convert alternating current from the AC circuit to direct current in the DC circuit 110. This provides current to the LED 116, causing it to emit light thereby indicating to the user that his telecommunications system indicator and protector 100 is in working order and that it can provide protection against lighting surges entering through the telecommunications connection 104.

In the event that lighting strikes a network of the telecommunications service provider such that a lightning surge is conducted to the telecommunications connection 104, either the bridge or the capacitor will be destroyed, depending on the magnitude of the surge, thereby creating an open circuit and preventing any current to flow to either the equipment or the LED 116. Due to the fact that no current is allowed to flow to the LED, it will no longer emit light thereby indicating to the user that the telecommunications system indicator and protector 100 has been damaged and that it should be replaced.

It will be appreciated by persons skilled in the field of telecommunications that the telecommunications system indicator and protector 42 of Figure 3

can be changed in a similar manner to provide an non-earthed circuit for providing protection against lightning surges.

It will be appreciated that the telecommunications system indicator and protector described above can be adapted to test larger numbers of telecommunications lines. This is achieved by simply adding a new line testing circuit and equipment testing circuit for each new line, as well as an additional LED.

It will be appreciated that any electrical light source could be used in the telecommunications system indicator and protector.

The telecommunications system indicator and protector has the advantage that it can indicate whether a fault is located on the telecommunications line of the service provider or in the equipment of a user. This is beneficial as the user would be able to notify the telecommunications service provider when the fault is located on the side of the telecommunications service provider without requiring a technician to respond to a call-out.

Another advantage is that the status of telecommunications lines can be monitored 24 hours a day such that faulty lines can be identified immediately. The telecommunications system indicator and protector further provides an option of disconnecting equipment from the telecommunications line, especially when the service provider is required to test the line. The telecommunications system indicator and protector is compact, cost-effective and as the indicator and protector is connected to the telecommunications network, no additional power supply is necessary to power it.

It is pointed out that the telecommunications system indicator and protector 10 and the telecommunications system indicator and protector 100 can be used in combination to provide protection against lightning surges. It will be appreciated that a similar arrangement is possible for accommodating a four line telecommunications line.

A telecommunications system indicator and protector in accordance with the present invention addresses the problems identified in the background portion of the specification.

DATED THIS 19TH DAY OF JANUARY 2004

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APPLICANTS' PATENT ATTORNEYS

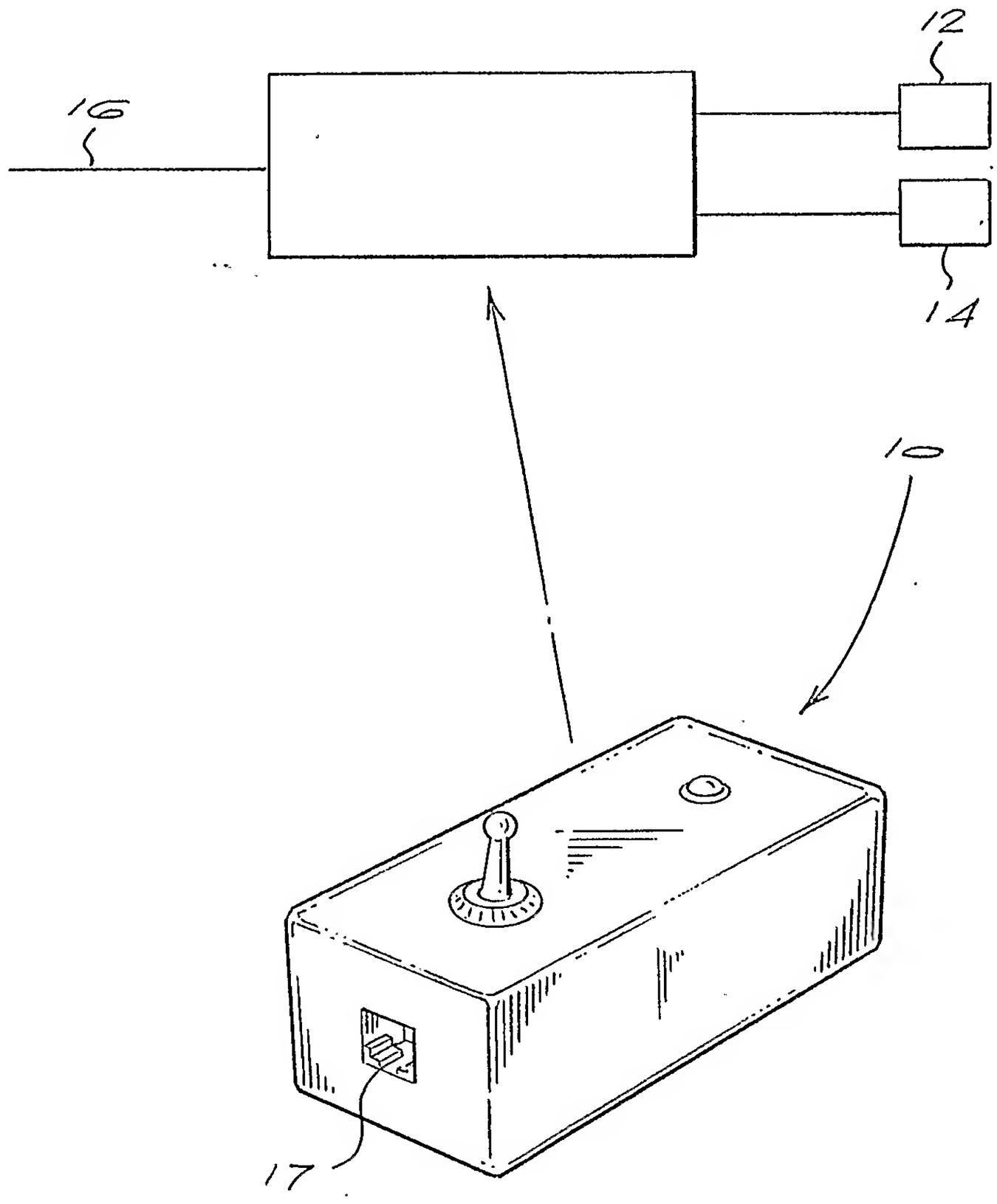

Fig.1

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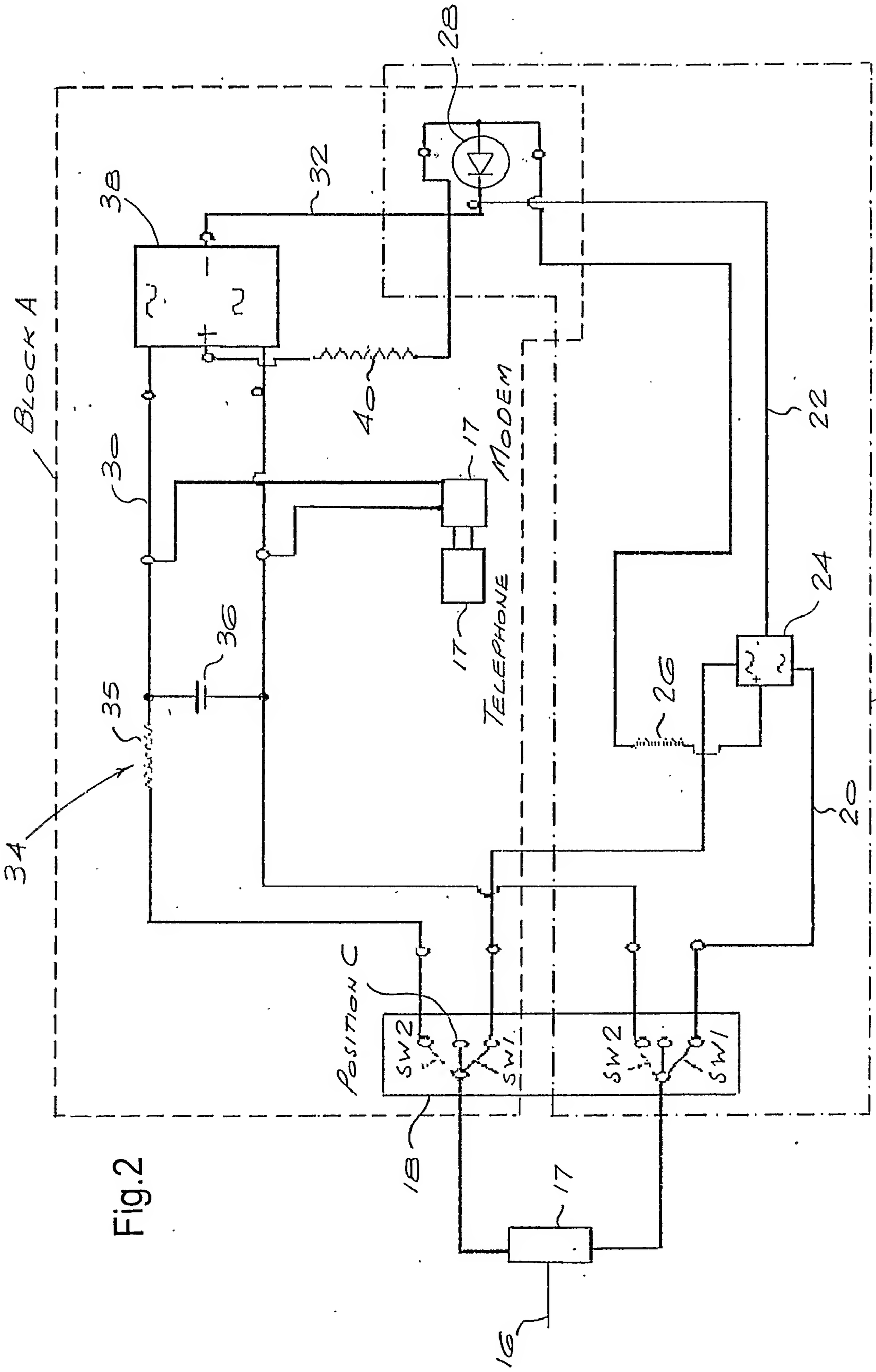

Fig.2

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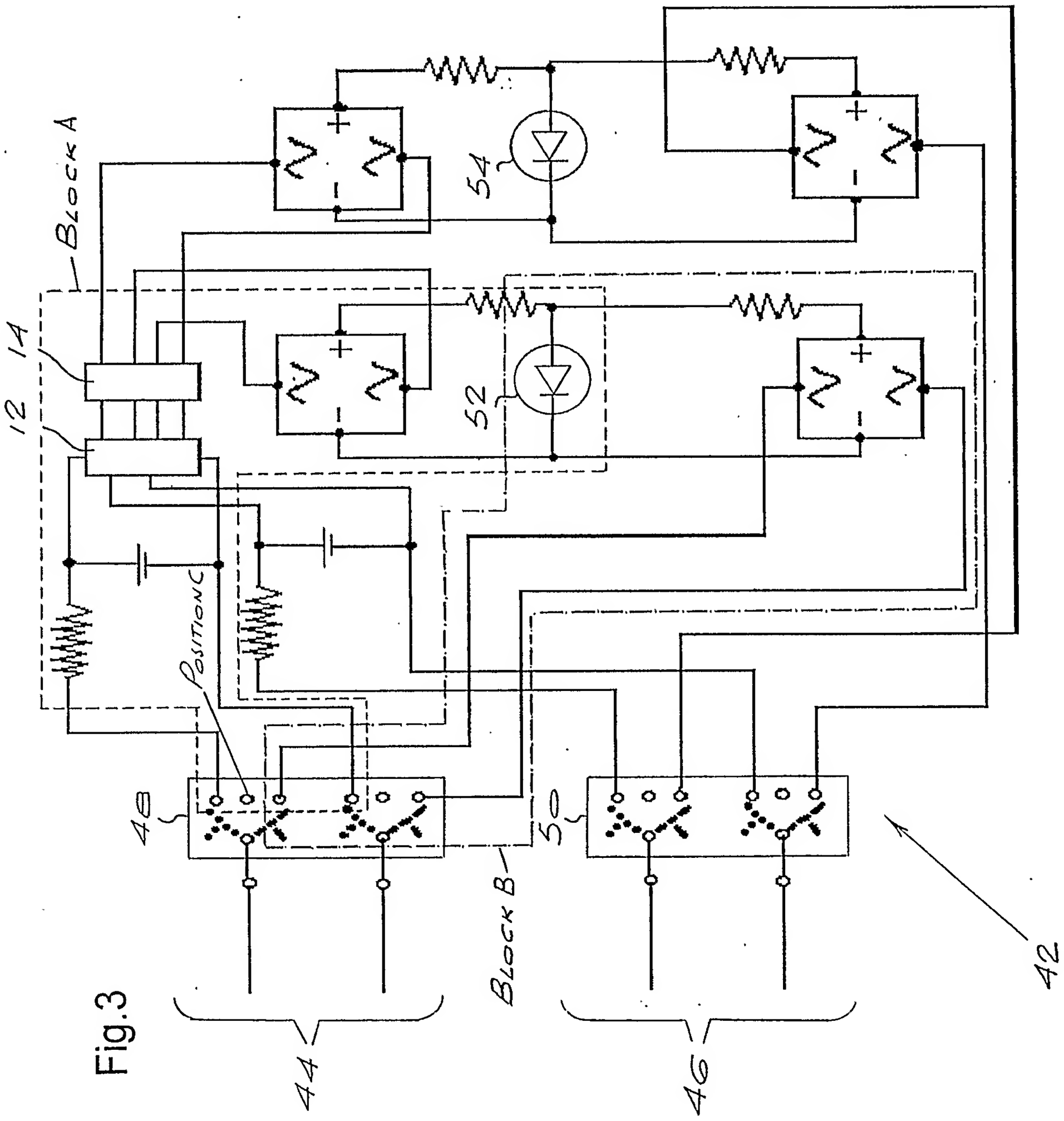

Fig.3

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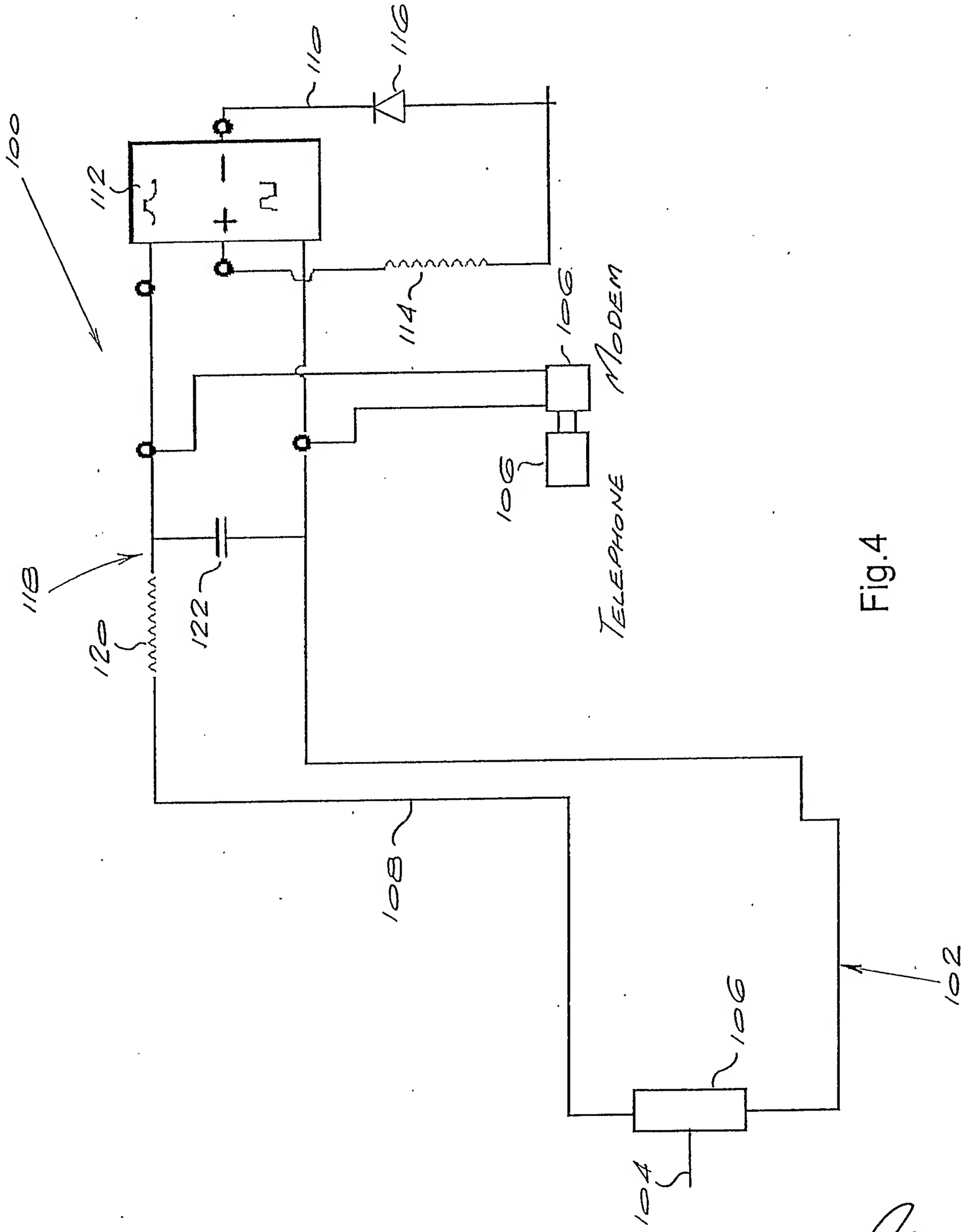

Fig.4

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